TECHNICAL REVIEW DOCUMENT OPERATING PERMIT 950PWE001

to be issued to:

Thermo Power & Electric Weld County Source ID 1230126

Prepared by Ashley L. Kendall April 7, 1998

I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties. Conclusions made in this report are based on information provided by the applicant in the Title V application submitted September 29, 1994, additional technical submittals of January 27, 1995, October 3, 1995 and January 16, 1996, and review of Division files. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

On April 16, 1998 the Colorado Air Quality Control Commission directed the Division to implement new procedures regarding the use of short term emission and production/throughput limits on Construction permits. These procedures are being directly implemented in all operating permits that had not started their Public Comment period as of April 16, 1998. All short term emission and production/throughput limits that appeared in the construction permits associated with this facility that are not required by a specific State or Federal standard or by the above referenced Division procedures have been deleted and all annual emission and production/throughput limits converted to a rolling 12 month total. Note that, If applicable, appropriate modeling to demonstrate compliance with the National Ambient Air Quality Standards was conducted as part of the Construction Permit processing procedures. If required by this permit, portable monitoring results and/or EPA reference test method results will be multiplied by 8760 hours for comparison to annual emission limits unless there is a specific condition in the permit restricting hours of operation.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised Construction Permit.

II. Source Description:

This source is primarily classified as a cogeneration facility defined under Standard Industrial Classification 4931. Electricity for sale is produced by two (2) combustion turbines and a steam turbine.

The facility is located in Greeley in an area designated as non-attainment for Carbon Monoxide (CO). This source is considered to be a major stationary source for Nitrogen Oxides (NOx) in an attainment area (Potential to Emit > 100 tons/year, one of the 28 listed sources) and is considered major for purposes of Prevention of Significant Deterioration (PSD) regulations. Future modifications to this facility which are in excess of significance levels as defined in Colorado Regulation No. 3, Part A, Section I.B.58, would result in the application of PSD regulations. Facility wide emissions are as follows:

<u>Pollutant</u>	Potential to Emit (tpy)	Actuals (tpy)	
PM	41.6	36.6	
PM10	41.6	36.6	
SO2	20.0	1.6	
NOx	1070.0	386.1	
VOC	12.86	11.0	
CO	90.0	89.0	

Potential to Emit is based on permitted limits. Actual emissions were provided in the Title V application and are for the 1993 data year.

The plant is within 100 kilometers of Rocky Mountain National Park, a Federal Class I designated area. Wyoming is an affected state within a 50 mile radius of this facility.

This facility certified within the Title V application they are not subject to 112(r), the Accidental Release Requirements.

III. Emission Sources:

The following sources are specifically regulated under terms and conditions of the Operating Permit for this Site:

<u>Units S001- S002</u> - Two (2) General Electric LM5000 Natural Gas Combustion Turbines, Rated at 339 MMBtu/hr Each, SN's: 474-203 and 474-122, Equipped with Steam Injection for NOx Control.

Discussion:

1. Applicable Requirements- These turbines were issued initial construction

permits in 1986 with a limit on hours of operation to stay out of PSD. In 1988, the hour of operation limits were removed and the turbines were issued PSD Permits with Best Achievable Control Technology (BACT) requirements. Final Approval for the PSD Permits were issued on November 24, 1989 (87WE113-1,-2) with the following applicable requirements:

- A. Visible emissions shall not exceed 20% opacity.
- B. Emissions of air pollutants for each turbine shall not exceed the following limitations:

PM	4.75 lb/hr	20.8 tons/yr
SO2	2.28 lb/hr	10.0 tons/yr
NOx	122.30 lb/hr	535.5 tons/yr
VOC	1.42 lb/hr	6.24 tons/yr
CO	10.27 lb/hr	45.00 tons/yr

The short term limits have been removed per policy change stated above except for SO2.

The NOx limit represents a Best Available Control Technology emission rate of 100 ppmv, and is more stringent then the New Source Performance Standard (NSPS) of 115 ppmv. (corrected to ISO conditions)

The NSPS SO2 limit of 150 ppm which would require PSD review for SO2, is superseded by the above SO2 limit.

C. Each Turbine shall be limited to a maximum consumption rate as listed below:

Natural Gas Consumption 2970 MMscf/yr

- D. This source is subject to requirements of Regulation No. 6, XXX (now Regulation No. 6, Subpart GG):
 - 1. Oxides of Nitrogen emissions shall not exceed 115 ppmvd @ 15% oxygen. Condition B above is more stringent therefore due to steamlining the more stringent limit will be used in the operating permit.
 - 2. The owner or operator shall install and operate a continuous monitoring system to monitor and record the fuel consumption and ratio of steam to fuel being fired in the turbine. The system shall be accurate to within ± 5.0 percent and shall be approved by the Division. Turbine engine and ambient temperatures shall also be monitored and recorded.
 - 3. The owner or operator shall monitor sulfur content of the fuel being fired in the turbines as specified in Section E.2. A fuel analysis shall be performed at least quarterly as proposed in the February 1989

Emission Compliance Report. Nitrogen content need not be monitored as long as pipeline quality natural gas is used. (The Division determined through engineering judgement that the use of natural gas shall ensure compliance with the sulfur content of the fuel therefore, fuel analysis for sulfur content will not be required).

- 4. Section E.3. defines periods of excess emissions which must be reported as required by Regulation No. 6.I.E.3. (Now Regulation No. 6, Part A, General Requirements).
- E. Revised APEN reporting in accordance with Regulation No. 3, Part A.II.
- F. Compliance with the NOx and CO limits of this permit shall be determined using the algorithm submitted in the compliance test report which is based on the NOx and CO envelopes. A new algorithm was submitted in 1991 to better correlate to the turbines actual operating conditions and more accurately determine compliance.

Turbines are considered 'Fuel Burning Equipment' and are therefore subject to Regulation No. 1, Part III, Section A.1.b. A particulate emission limit of 0.11 lb/MMBtu was calculated for each turbine. Since the emission factor used to demonstrate compliance with the emission limitations in Condition B above is lower than the Reg 1 limit no demonstration will be needed to show compliance. The same is true for the Regulation No. 6, Part B, Section II.D.3.b SO2 limit. The Reg 6 sulfur dioxide emission limit of 0.35 lb/MMBtu has been included in the operating permit.

2. Emission Factors- Emissions from these simple cycle turbines are produced during the combustion process, and are dependent upon operating conditions and specific properties of the fuel being burned. The pollutants of concern are Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Sulfur Oxides (SO_X), Particulate Matter (PM and PM_{10}) and Lead. Small quantities of Hazardous Air Pollutants (PM are also emitted dependent upon the makeup of the fuel and combustion efficiency. The Compliance Emission Factors used to determine emission limits in the Permit for the turbines are from manufacturer's data and are compared to PM-42, Section 3.1, Table 3.1-1 for Uncontrolled Stationary Gas Turbines for Electric Generation Burning Natural Gas and Table 3.1-2 for Controlled Stationary Gas Turbines for PM0 (water injection raises PM1). However, the algorithm (See Appendix G) will be required to determine the emissions of PM2 from the turbine.

Turbines:

Pollutant Emis	<u>ssion Factor (lb/MMBtu)</u>	AP-42 (lb/MMBtu)
PM/PM10	0.014	0.042

SO2	0.0067	0.94(S)*	
VOC	0.0042	0.024**	
CO	0.030	0.16	

^{*} where 'S' is the sulfur content of the fuel.

The source requested the use of lb/MMscf based emission factors for calculation of emissions. It is Division policy to use lb/MMBtu based emission factors for natural gas due to the varying Btu content. This insures Btu dependent calculations for emissions. Therefore, the emission factors shall be expressed as lb/MMBtu.

- **3. Monitoring Plan-** The source indicated in their application that they would demonstrate compliance with the emission limits by multiplying the emission factors and fuel use for PM10, SO2 and VOCs. The algorithm generates pass/fail for both NOx and CO and an emission rate for NOx. It does not, however, generate an emission rate for CO. They will therefore use the algorithm to determine compliance with both NOx and CO emission limits, but for inventory purposes the CO emissions shall be calculated using the emission factor above. In addition the source will be required to continuously monitor fuel consumption, the ratio of steam to fuel being fired in the turbines, turbine engine temperature (T-44), and ambient temperature (T_0). Portable monitoring on both NOx and CO shall be conducted quarterly and a performance test shall be done twice during the permit term, once within the first year and once within the last year.
- **4. Compliance Status-** Current APENs reporting criteria pollutants and Hazardous Air Pollutants is on file with the Division. The source certified within their application that they are in compliance with all applicable requirements. Therefore, the Division currently considers these turbines to be in compliance with all applicable requirements.

IV. Insignificant Activities

Stand-by diesel generator, 500 KW

Diesel fire pump

Diesel forklift

Diesel storage tank, for generator

Diesel storage tank, for fire pump

Five (5) indoor chemical storage tanks

Sodium Hypochlorite storage tank

Three (3) oil lubrication system vents, for Turbine #1

Three (3) oil lubrication system vents, for Turbine #2

Oil lubrication system vent, for steam turbine

<u>Cooling Tower</u> - The cooling tower was originally included as a significant activity due to Chloroform (VOC) emissions. These emissions were determined from an

^{**} This value is for TOC, @ 10% VOC = 0.0024.

old EPA Air Chief Version with an overly conservative emission factor. Since that time two additional versions of EPA Air Chief have been released both without an emission factor for Chloroform from cooling towers. Therefore, the Chloroform emissions are assumed to be negligible and the cooling tower an insignificant activity.

V. Alternative Operating Scenarios

The source has requested that replacement turbines be allowed during routine major maintenance. The source must be willing to accept a determination of non-compliance should flue gas analyzer testing indicate that the emissions for the turbines in question exceed those defined in the Operating Permit. Non-compliance will be considered to have occurred from the day the turbine was replaced. Please note the serial numbers referenced in the operating permit are the current turbines onsite. Different serial numbers than listed will indicate the use of a replacement turbine covered under the alternative operating scenario.

The source indicated that during routine major maintenance the turbine can be gone as long as 5 months. In order to allow this maintenance under temporary engine replacement the permit has been written to allow an extension of the 90 days that determine temporary verses permanent replacement.

VI. Permit Shield

The source identified a list of nonapplicable requirements that they wish to be specifically shielded from. Only those requirements that could be reasonably expected to be applicable to this facility were included in the draft Operating Permit. The following requirements were included:

Colorado Regulation No. 1, III.A., Particulate Emissions - The Cooling Tower at this facility does not fall under the regulated categories for particulate emissions.

Colorado Regulation No. 1, IV.B. - Gaseous fuel is the only fuel burned in these turbines.

Colorado Regulation No. 6, B.IV., Performance Standards for New Sources of Sulfur Dioxide - Emission Units at this facility do not fall under the regulated categories for this requirement.

40 CFR 63, Subpart Q Cooling Tower (Colorado Regulation No. 8, Part A, NESHAPs, Subpart Q) - This facility does not use chromium-based water treatment chemicals.

40 CFR 72, Federal Acid Rain Permitting Provisions (Colorado Regulation No. 18) - The facility is exempted from the acid rain regulations by 40 CFR 72.6(b)(5). The facility is a qualifying facility that entered into a power purchase agreement for more than 15% of its total capacity prior to November 15, 1990.